DOCUMENT RESUME

ED 057 796 JC 720 032

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TITLE	How to Search the ERIC File.
INSTITUTION	American Association of Junior Colleges, Washington, D.C.; California Univ., Los Angeles. ERIC Clearinghouse for Junior Coll. Information.
PUB DATE	Mar 72
NOTE	4p.
JOURNAL CIT	Junior College Research Review; v6 n7 March 1972
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Information Centers; *Information Dissemination; Information Networks; *Information Retrieval; *Information Systems; *Information Utilization; Research Reviews (Publications)
IDENTIFIERS	Educational Resources Information Center; ERIC

ABSTRACT

The ERIC information system is designed for computerized information storage and retrieval. While the computer can play an increasingly more vital role in facilitating reference searches of large literature collections, experience shows that manual searching gives the user skills and expertise that are essential to effectively use the computerized system. Several tools are available to aid in manually searching for information stored in ERIC files. These are: (1) Research in Education (RIE), composed of a series of document resumes and subject, author, and institution indexes; (2) Current Index to Journals in Education (CIJE) containing coverage of 530 publications representing the core periodical literature in education; and (3) the Thesaurus of ERIC Descriptors with its vocabulary used for indexing the various documents, projects, and journal articles entered into the ERIC information system. A subject search of the ERIC file requires three major steps: (1) establish a clear and concise statement of the problem or information need; (2) follow the two sequential procedures for manually searching the subject index; and (3) review the document resumes and article citations located in the subject index. Search strategies using the computer still require the use of principal ERIC tools, but in magnetic tape form. Whether manual or computerized searches are undertaken it will be necessary for users to ultimately seek actual documents in libraries or order them from ERIC. (Author/AL)

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Volume 6, Number 7

ERIC

JUNIOR COLLEGE RESEARCH REVIEW

March 1972

Published by the American Association of Junior Colleges

ED057796

HOW TO SEARCH THE ERIC FILE

In a broadly-based information system such as the Educational Resources Information Center (ERIC), with more than 90,000 citations in its principal files, it is important that its present and potential users understand both the products of the system and the procedures of information retrieval. The ERIC information system is designed for computerized information storage and retrieval, and the number of computer centers offering search services to users in the field is growing rapidly. Furthermore, such centers either have or soon will have the ability to search the entire ERIC document collection (through *Research in Education*) and the resources of many education periodicals (through *Current Index to Journals in Education*). While the computer obviously plays a vital role in facilitating reference searching of large literature collections or data bases, practice shows that manual searching, though tedious and time-consuming, gives the user skills and expertise that are essential to the effective use of the computer.

For background, a brief explanation of the nature of the documents in ERIC and their relevance to junior college educators (e.g., teachers, administrators, trustees, librarians, counselors, or others) is appropriate. Among others, the ERIC file includes reports on innovative programs, research and evaluation results, interpretive summaries, research reviews, and reports of conferences. For junior college faculties and staffs, many titles are significant but only a scant sample must suffice here: for example, *Strategies for Change: A Case Study of Innovative Practices at the Coast Community College District* (ED 051 806); *Experiment and Research in the Use of a Writing Laboratory* (ED 041 576); *Research and Compensatory Education: What Are We Doing?* (ED 041 581); and *One Institution: Six Alternatives* (ED 048 857).

JC 720 032

Exactly how is information stored in the ERIC files or data bank, and what tools must one use to review the literature? Twenty subject-focused clearinghouses are responsible for acquiring and screening reports to be disseminated through ERIC. Each is responsible for acquiring the literature in its special field, including unpublished documents, reports, and appropriate periodical articles. Professional subject-matter experts then select the most relevant items and prepare brief abstracts or summaries of their contents. After they are indexed by topic and by author, the information is made available through two monthly publications – *Research in Education* (RIE) and *Current Index to Journals in Education* (CIJE). The ERIC facility, operated by a private contractor, gathers the information about the reports submitted by the clearinghouses and converts it to a computer tape record that is then used by the Government Printing Office to produce *Research in Education*, the announcement journal for new reports. Copies of the original documents are transferred to the ERIC Document Reproduction Service, where they are made available both on microfiche (a flat 4 x 6″ sheet of film) and in full-size reproduction. At the same time, information about the published literature appearing in more than 500 education and education-related periodicals is made available monthly through the *Current Index to Journals in Education*, a computer-generated index that is a joint venture between Crowell, Collier, Macmillan Information Corporation, and ERIC. It is important to remember that, although both these reference tools are produced by computerized processes, each is available in "hard copy" on a subscription basis.

All documents in both files are stored as "citations." Although there is some difference in the arrangement and depth of information given on reports and journal listings, a citation generally consists of the following elements: the title of the report or journal article, the author's name, the facility where the work was carried out or the bibliographical information for a journal article, and a consecutive identifying number. This is followed by a list of descriptors (subject headings) or index terms, which actually are the subject key to the store of information. In the hard copy of both reference tools, certain of these terms or descriptors are designated with asterisks (*), meaning that only those terms can be searched for manually. For users of *RIE*, an abstract or summary of the contents of each document is included, and for those using *CIJE* for the journal literature, a one- or two-sentence annotation is often found with the citation.

THE TOOLS OF ERIC

(1) *Research in Education* (RIE) is made up of document resumes and subject, author, and institution indexes. These resumes (abstracts) highlight the significance of each document and are listed sequentially in the Document Section by ED number. The indexes, which follow the resumes, cite each document by title and ED number. For the full bibliographic citation, the user must return to the Document Resume Section. The subject, author (investigator), and institution indexes are cumulated annually in a single volume. The resumes are not cumulated, and therefore, in searching this file, one must proceed from the annual indexes to the monthly issues of RIE to locate specific resumes.

(2) *Current Index to Journals in Education* (CIJE) now covers 530 publications, which represent the core periodical literature in the field of education. Citations to journals in a particular issue of *CIJE* represent the titles received by the various processing centers during the month previous to publication. *CIJE* is arranged in four sections: three indexes – subject, author, and journal content – and a Main Entry Section. The indexes cite journal articles with the appropriate bibliographical information. The Main Entry Section is arranged in broad subject categories and includes all of the information presented in the indexes and brief annotations as needed. Compatibility with the ERIC information retrieval

system is achieved by assigning an EJ (ERIC Journal) accession number to each main entry. As with *RIE*, the various indexes and the main entry section cumulate annually and semi-annually.

(3) *The Thesaurus of ERIC Descriptors* is a vocabulary developed by subject specialists and used for indexing the various documents, projects, and journal articles entered into the ERIC information system. Since all descriptors (terms, subject headings) in the *Thesaurus* have been derived from documents or articles previously in the ERIC system, this list of topics represents an up-to-date subject index to the ERIC files. The *Thesaurus* is thus an authoritative list of terms that helps a user label the concepts or ideas in his statement of needed information and identify new ideas in the same subject search.

Two types of terms are included in the *Thesaurus:* descriptors and synonyms or near-synonyms. As noted before, descriptors are terms used for indexing and for searching the resources of the ERIC system. They are arranged in alphabetical order in the *Thesaurus.* Synonyms or near-synonyms of descriptors are displayed with the appropriate descriptor and with notations indicating their relationship.

Two divisions of the *Thesaurus* are particularly helpful in developing search strategies. The *Rotated Descriptor Display* is a generic list of every descriptor rotated alphabetically instead of being separated in the traditional alphabetical arrangement as in the main body of the *Thesaurus.*

For example: Scientific Manpower
Manpower Development
Manpower Needs

As another example, "Visually Handicapped" would occur in a different location from "Mentally Handicapped." The *Rotated Descriptor Display* solves this problem by alphabetizing the word "Handicapped," regardless of where it occurs in a multi-word descriptor. It is an alphabetical index to all significant words that form descriptors in the *Thesaurus.* Using this *Display,* one may select pertinent descriptors and proceed to the *Descriptor Listing,* another important division of the *Thesaurus.* It is structured to give complete information about the intended scope and usage of each descriptor.

For example: Junior College Students
BT College Students
(Note: BT means Broader Term, directly related to the Descriptor)
RT Community Colleges
(Note: RT means related terms to examine)
Higher Education
Junior Colleges
Post Secondary Education

It should be noted that the use of the *Thesaurus* in an initial search of ERIC may not be essential. However, as one defines and redefines his needs for information, as with any subject heading list, it becomes an increasingly important tool.

STEPS TO BE FOLLOWED IN DOING A SUBJECT SEARCH OF THE ERIC FILE

Step I—Statement of the Problem

Whether one approaches the ERIC data base manually or through a computerized system, it is important to establish a clear and concise statement of the problem or information need. This should include the major topical area, specific subtopics, the instructional level (e.g., junior college), and the type of information sought (e.g., research, methodology, bibliography, summary review, or other). The following is an example of an information need:

Problem Statement: What research has been done to assist junior colleges in determining vocational education or occupational training programs most essential to the manpower development of local communities?

By underlining the key concepts or phrases of this statement, one immediately identifies subjects and possible searchable terms.

Example: *junior college* (level of instruction)
research (type of information)
methodology (type of information)
vocational education (major topic)
occupational education (major topic)
manpower development (specific subtopic)
community (specific subtopic)

Step II—Manual Search by Subject Index

Several steps may be followed here, either with or without the use of the *Thesaurus.* For the sake of consistency in preparing for a computer search, however, emphasis will be placed on the use of the *Thesaurus.*

(1) Determine the descriptors covering the Problem Statement from the *Thesaurus* by (a) using the *Rotated Descriptor Display* and looking up the major topics (Vocational Education; Occupational Training); and/or (b) using the *Descriptor Listing* section of the *Thesaurus* and looking up the topics to determine whether they are used as ERIC Descriptors (if they are not, a cross-reference may direct you to a synonym, e.g., Occupational Training *use* Vocational Education); or (c), scanning the array of related descriptors listed below each main descriptor (in boldface type) to be sure that you have chosen the most specific for your needs. Note that, of the searchable elements in the Problem Statement presented here, the *level* and *type* descriptors are seldon useful in manual searching because of their general nature. In fact, "Junior College" is used with each document submitted by the ERIC Clearinghouse for Junior Colleges to separate out that segment of the literature, but *level* and *type* are critical terms in an automated search on a specific topic.

(2) Using the latest cumulated issue of the indexes (*RIE* and *CIJE*), search the subject indexes for the descriptors you have chosen. For current listings, search the latest monthly issues of the indexes. List the ED or EJ numbers in columns under each descriptor as below. These accession numbers may be used for cross-reference, document location, and document ordering.

Manpower Development	*Vocational Education*
ED 043 725	ED 043 725
ED 044 782	ED 044 782
ED 047 677	ED 047 667
ED 047 100	EJ 028 091
	EJ 028 093
Manpower Needs	*Junior College*
ED 044 782	ED 047 667
ED 043 753	ED 046 637
ED 044 767	ED 047 678
ED 044 519	EJ 028 091
Community Relations	
ED 047 100	

It is likely that the accession numbers (ED or EJ numbers) will appear under more than one of the descriptors being searched. In the example above, ED 044 782 is found under Manpower Needs, Manpower Development, and Vocational Education; EJ 028 091 is found under both Junior Colleges and Vocational Education. Such cases are instances of descriptors being assigned to document and article listings for the purpose of "tagging" or "labeling" concepts in the literature so that they may be retrieved more easily. In the ERIC program, descriptors (indexing terms) are assigned to be used either together or separately in the search process. In many cases, the relationships between terms have already been determined, as with Manpower Needs or Part-time Students. Much the same procedure is followed when a retrieval specialist asks for a computer search using such appropriate

terms as Manpower Needs, Vocational Education, and Junior Colleges. In both cases, an identical number under two or more index terms may well mean that the most revelant information is contained in that particular document.

Step III — Review of Document Resumes and Article Citations

In the case of *Research in Education*, arrange the ED numbers in sequential order and go to the listings in the Document Resume Section of RIE. Search for the ED numbers, evaluate the resumes, and note those that appear to satisfy the Problem Statement. Documents in the *RIE* file may be ordered in microfiche or in hard copy from the following agency:

ERIC Document Reproduction Service
LEASCO Information Products, Inc.
P.O. Drawer O
Bethesda, Maryland 20014

Many universities, state departments of education, and local school districts subscribe to the entire ERIC file for all to use.

For complete journal citations, look up the EJ accession number in the Main Entry Section of the *Current Index to Journals in Education*. The journals are also available in many libraries.

SEARCH STRATEGIES USING THE COMPUTER

The advent of the computer has led to numerous changes in the method of storing and retrieving information. As noted elsewhere in this document, the principal ERIC tools for retrieving information, *RIE* and *CIJE*, are available in machine-readable form on magnetic tapes. The tape files, identified as Report Resume Files (RIE) and Journal Article Resume Files (CIJE) consist of all numbered ED documents and all EJ accessions in the ERIC file. Each file is kept current by quarterly up-date tapes. The tapes are prepared in IBM OS/360 format for either direct use or for conversion to a special format.

For the information seeker, subject access to these bibliographic data bases via the computer depends on many of the procedures discussed earlier, namely, the production of a refined Statement of the Problem and the translation of this information need into the language or vocabulary of the ERIC system. The next stage is combining the terms or descriptors of the vocabulary into groups, so that only the most specific and relevant citations will be located by the computer. In the ERIC program, which uses coordinate indexing, documents are described by specific index terms as opposed to the broad subject headings usually used in a library. This allows the user (searcher of information) to build his own subject headings at search time by specifying desired *and*, *or*, and *not* relationships between descriptors. This may be explained best by examining the original Problem Statement again, recasting it as necessary to comply with the terminology given in the *Thesaurus of ERIC Descriptors*, and then establishing the appropriate relationships between the descriptor groups.

> Problem Statement: What research has been done to assist junior colleges in determining vocational education or occupational training programs most essential to the manpower development of local communities?

Among others, two statements or queries would best describe this information need:

> Query 1 — Vocational Education *and* Manpower Needs *and* Community Surveys *and* Junior Colleges

In this instance, using the *and*, a citation found by the computer will result in a printout *only* if all of the four descriptors listed above have been used as index terms for the same document.

> Query 2 — Vocational Education *or* Trade and Industrial Education *and* Manpower Development *or* Manpower Needs *and* Community Surveys *or* Occupational Surveys *and* Junior Colleges *or* Community Colleges

This query, making use of both *and* and *or*, has been expanded by using the *Thesaurus* more thoroughly, noting synonyms and hierarchical relationships between main descriptor entries and those of other classes.

When several queries have been developed, they usually are batched, key-punched, and fed into the computer. The results are then separated by query and returned to the user for review.

In summary, four steps must generally be followed to prepare and complete a computer search of the ERIC files:

1. refining the Problem Statement (or information need)
2. identifying and selecting the appropriate ERIC descriptors
3. combining or relating index terms (descriptors) by *and*, *or*, and *not*, to define an appropriate search expression
4. evaluating the results of the search and modifying the original query as necessary.

Computerized searches of information files depend on the programs or instructions a computer must receive to accomplish a desired task. Several versions of such programing systems are available for the ERIC file, and the choice will govern which data elements in each bibliographic record may be scanned. Suffice it to say, one obviously may do a subject search (as illustrated in this document) or a search for author, institution, ED or EJ numbers, among others.

Whichever type of retrieval is undertaken, it will still be necessary for the user to go with his computer-generated references to the actual documents — probably in a library — or to order the documents directly from ERIC. The next development in the state of the art will probably see an automatic linking of reference retrieval with actual document retrieval. The fact that the complete ERIC document collection is available in microfiche form now takes on added significance since mechanized retrieval of microfiche is already a reality.

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INSTANT INFORMATION: A DEMONSTRATION

The number of possible uses for information available in the ERIC system is exceeded only by the need for information. The major problem is to bring the practitioner and the material together in some efficient, immediate manner. Practitioners may obtain information in a number of ways on all of the documents in the ERIC system by use of *Research in Education*. The manual search described above is the most direct method, and is sufficient for the researcher compiling data for reference use.

Often, however, the practitioner needs instant information. Instant information can serve two purposes. One, it is immediate; and two, it tells the user if any of his requested data are not available. Many may feel that this is a luxury — but is it? Can decision makers rely on telephone calls to friends for reliable information, or take the time to search through volumes of writings only to find that the information is nonexistent?

The fact is that instant information is available, and can be obtained either through a computer printout or a video display. The latter requires a computer, ERIC tapes, and a terminal. Documents are also available in microfiche and can be searched and found instantly by the automatic fiche retrieval machine.

Information acquisition by computer tapes and a fiche retrieval unit will be demonstrated at the AAJC convention in Dallas, February 29-March 1, 1972. There, users may request a search for documents that will be relayed, via telephone lines, to the computer at UCLA. The resulting document identification will be transmitted to Dallas, then used to obtain the fiche by means of the automatic fiche retrieval unit.

Although this is an eye-catching demonstration, novelty is not the basic reason for its use. It is the objective of this Clearinghouse effort to alert the practitioner to the fact that instant information is available in many forms, including the use of the computer, for he often overlooks the point that all information originates from the same source. To use the computer in the ERIC demonstration at the convention, the same ERIC reference materials as used in the manual search method, namely the RIE, must be used.

Indeed, all materials used in an ERIC search are the same. The form in which the data are eventually produced varies, as does the speed, but the essential tools of reference are identical for any document search. All these reference materials will be on display at the AAJC convention.

For the cost of an annual subscription to RIE, practitioners are able to avail themselves of instant information. Duplication of the model to be shown in Dallas would be expensive, but the concept to be demonstrated and the materials used cost less than $30 a year—certainly well within the means of most practitioners.

Young Park
Public Administrative Analyst

ERIC CLEARINGHOUSE FOR JUNIOR COLLEGES

ARTHUR M. COHEN, *Principal Investigator and Director*

The Clearinghouse operates under contract with the U.S. Department of Health, Education and Welfare, Office of Education.

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Abstracts of the ERIC (Educational Resources Information Center) Documents can be found in *Research in Education (RIE).* This publication of the Department of Health, Education and Welfare is available from the Government Printing Office, Washington, D.C. 20402 at $1.75 for a single issue or $21.00 for twelve issues yearly. The index to it is cumulated annually and semi-annually.

The ERIC Documents (ED's) may be purchased on microfiche (MF) or in hard copy (HC) from ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Md. 20014. MF prices are $.65 per document, regardless of size; HC costs $3.29 per units of 100 pages or less. A handling charge is not required.

The *Current Index to Journals in Education (CIJE)* indexes articles from more than 500 current journals and periodicals. It is available from CCM Information Corporation, Inc., 909 Third Avenue, New York 10022 at $3.50 per copy or $39.00 for twelve issues annually.

The *Junior College Research Review (JCRR)* is compiled and edited at the ERIC Clearinghouse for Junior Colleges, Room 96, Powell Library, University of California, Los Angeles, California 90024.

The *JCRR* is published ten times per academic year. Subscriptions are available at $3.00 each from the American Association of Junior Colleges, One Dupont Circle N.W., Washington, D.C. 20036. It is published and copyrighted by AAJC; copyright is claimed until March 1977.

Besides processing documents for the ERIC system and issuing the *Junior College Research Review,* the Clearinghouse publishes two other series of its own. The Monographs are in-depth studies or interpretations of research on junior colleges. They are available from AAJC at $2.00 each. The Topical Papers are either research models useful for general junior college testing or items of occasional interest to the field.

A free publications list is available from the Clearinghouse.

Hazel Horn, Editor

JUNIOR COLLEGE RESEARCH REVIEW

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